SDE (OI&T)
NEW CONSTRUCTION/REMODEL GUIDELINES

_____**CABLE SPECS:**

- VOIP (Voice Over Internet Protocol) Cisco Phones on Network
- Wireless Access Points (AP)
- Network

_____**COW'S:**

- Battery Stations (See Bio-Med) For Stinger Carts

_____**GUEST NETWORK:**

- Wireless AP (See public Affairs)

_____**FIBER SPECS /TELCO:** (OI&T Supply Front Lock Plates)

- New Building Construction – Note: Page 12

_____**TELCO CLOSETS:**

- Size
- Rack Location
- UPS

_____ **TELE-HEALTH:** (See Tele-health)

_____**KIOSKS:**

- My Healthy (See Sharon Hartman)
- Auto Checklist (HAS – Barbara Frisbey)
- Bingo (See Service/OI&T)

_____**BIO-MED:** (See Bio-Med)

- Hard Wire Location
- Bed Management (Connections for Vital Signs, EKG, Monitoring, Etc.)

PART 1 – GENERAL VA LOMA LINDA HEALTH CARE SYSTEM

SECTION INCLUDES PART I OVERVIEW:

1.1 Codes of Practice

Adherence to the VA Network Cable Specifications by cabling installation contractors is a condition of contract. In the event the cabling installation is sub-contracted by the prime contractor, the prime contractor will supply a copy of these specifications to the sub-contractor. This requirement shall cover all levels of sub-contracting.

Any variations to the issued job specification shall be referred for approval to the Contracting Officer Technical Representative (COTR).

Contractors shall install all cable and cabling products with a proven track record for data network cabling installations. Such installations shall also meet all requirements as set out in this specification.

Un-terminated "future capacity" cables are not permitted. All installed cables shall be terminated at each end and documentation, labeling and (where applicable) test results provided. This applies to all permanently installed cable types.

1.2 Documentation

At least two copies of documents describing the data cable installation shall be provided.
A copy to be supplied to the COTR for approval

1.3 Network Equipment

COTR must approve the installation or removal of network hardware equipment. Non-VA staff shall carry out such work only with prior approval from the COTR.

1.4 Network Equipment Environment

Punch down area(s) (location of the data communication rack(s)) will be determined by the building Architect/Engineer and the COTR.

Contractor shall supply at minimum 1000BaseT, Category 6 certified rack-mounted modular RJ45 HIGH DENSITY patch panel (24/48 ports) for jacks meeting the ANSI/EIA/TIA t568-A- category 6 standards.

Contractor will supply contract specified number of 19"W x 84"H steel data communication rack. Both racks shall have a grounding wire and bus bar installed to earth ground.

Where network equipment is to be located in a secure room or large closet, the room or closet shall have a dry powder extinguisher, suitable for electrical fires, provided and installed within the room. Air conditioning is required in each IT room. And the OI&T key core should be installed.

PART 2 – SECTION 2 INCLUDES PART 2 OVERVIEW:

2. Requirements include but are not limited to the following:

1. Installation of horizontal and vertical telecommunications backbone cables in cable trays and through vertical paths in the building.

2. Horizontal installation of unshielded twisted pair (UTP) cables in cable trays, conduits, surface raceways, or exposed as required in Part 3 of this section and shown on the drawings.

3. Installation of backbone termination facilities, multi-jack patch panels and multi-media assemblies.

4. Termination of backbone and unshielded twisted pair (UTP) cables.

5. Testing of cables and terminations.

2.1 RELATED SECTIONS

Section 16010 - Basic Electrical Requirements

Section 16111 - Conduit

Section 16112 - Surface Raceways

Section 16115 - Indoor Service Poles

Section 16195 - Elect. Electrical Identification

2.2 REFERENCED STANDARDS

A. Electronic Industries Association/Telephone Industries Association - EIA/TIA-568A Commercial Building Telecommunications Wiring Standard For 1000 baseTx Networks.

B. American National Standards Institute/Institute of Electrical and Electronic Engineers ANSI/IEEE 802.3 Standards for Local and Metropolitan Area Networks: Carrier Sense Multiple Access with Collision Detection (CSMMCD) Access Method and Physical Layer Specifications

2.3 SYSTEM DESCRIPTION

A. The system is a series of unshielded cables and terminations between telephone and computer equipment jacks and LAN communications connection concentration points. The system must be tested to verify satisfactory ANSI/IEEE and circuit parameters.

2.4 QUALITY ASSURANCE

A. Manufacturer and installer qualifications: To be specialists in the installation and testing of telecommunications systems and local area networks.

2.5 PRE-CONSTRUCTION CONFERENCE

A. Schedule an "in-brief meeting" with each working group to confirm the work and determine the specific and special conditions for the area(s).

2.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to the site.

B. Store and protect products in a clean, dry space. Maintain factory wrapping or provide an additional coveting to protect units from dirt, water, construction debris, and traffic.

C. Handle in accordance with manufacturers written instructions. Handle carefully to avoid damage:

PART 3 - PRODUCTS

3.1 ACCEPTABLE MANUFACTURERS

A. Data jacks will consist of: One each [Yellow, Ivory, Gray]

B. Patch Panels: CAT 6 48 Port

C. LAN Cable: Com Scope, Berk-Tek, Mohawk/CDT, Essex, or approved equivalent (Yellow, Blue, and Red)

D. LAN cable standoffs - Panduit PPIS-SIOX (2"), PP2S-SIO-X (4-5/8") or approved equivalent.

E. LAN cable tie mounting device - Panduit PLC-2S-S 1 0 series, or approved equivalent.

F. LAN Wire Management: Ortronics (OR-60400129)

G. Data face plates: Electrical Ivory

PART 4 - EXECUTION

4.1 INSTALLATION

A. INSTALLATION CONTRACTORS ARE REQUIRED TO POST A COPY OF THE CABLE SPECS IN PATCH PANEL AREA DURING CONSTRUCTION.

B. Horizontal backbone cables shall be installed in segregated cable trays as shown on the drawings. Vertical backbone cables shall be installed through floor sleeves and supported by kellum or approved strapping methods on plywood wall surface.

C. Unshielded Twisted Pair Level 6 (UTP) Cables:

1. Install 3 Category 6 unshielded twisted pair cables per face plate as shown on the drawings (Diagram 1). Length will not exceed 90 meters (295 feet) for Level 6 cable. Offices and other finished areas shall have the wiring concealed if possible.

2. Do not exceed a minimum bending radius of 8 times the diameter of the cable in free flowing configurations. The radius in surface raceways, furniture panels and termination boxes should be at formed around a 1/2" dowel to avoid a change in the wire characteristics affecting the near-end cross talk.

3. Tears or twists in the sheaths are not permitted. Splices, bridge taps or any method of repairing a damaged cable is not allowed.

4. The maximum pulling tension on the cable shall not exceed 25 pounds.

5. Support cable groups of more than 8 cables using devices that have at least 1/2" of surface area where the support comes in contact with the cables and shall be free of sharp edges or

fasteners. Branches from cable bundles must be made with a minimum 8" radius (no kinks). Supports shall at a maximum span of 48 inches.

6. Plastic ties used to support individual and groups of cables of 7 or less must be pulled up snug, hand tight only to prevent "denting" of the cable sheath. Supports shall at a maximum span of 48 inches. Where possible Velcro cable ties shall be used.

7. Support cables to provide a visible sag in the cable run between supports to prevent over-stress of the cable system. Sag minimums are as follows:

1.0 in.	48 in. span
0.5 in.	32 in. span
0.25 in.	24 in. span

8. Conduit runs used to protect the cable shall be no longer than 200 feet without a pull point. No run of conduit shall have more than two 90-degree bends between pull points. The inside-bending radius shall be at least 6 times the diameter of the conduit. Conduit larger than 2 inches shall have a bending radius no less than 10 times the conduit diameter.

8A. Conduit shall be secured to interstitial floor as appropriate. Fire Stop MUST BE USED when penetrating thru a fire wall, floor or ceiling. (HILTI CP 618 Firestop Putty or equivalent). When installing data cable horizontally thru a fire wall a metal conduit must be installed for the data cable to pass thru and fire stop used where the conduit passes through the wall as well as around the cable. Sealing off the entire hole in the conduit on both sides of the fire wall. When data passes vertically thru the floor a metal conduit must be installed and fire stop shall be used at the top of the conduit as well as where the conduit passes thru the floor. When data passes thru the ceiling vertically a metal conduit must be installed and fire stop shall be installed at the bottom of the conduit as well as where the conduit passes thru the ceiling completely sealing off the conduit.

8B. All unused cabling from demolition of projects shall be removed from premise cable.

9. Open LAN wiring shall be separated by 18" from a fluorescent light fixture. Use of conduit is recommended where this separation cannot be maintained. Cable pathways shall avoid EMI sources such as motors, transformers, and electrical equipment and power cables that serve them.

10. Color Code:
a. Pair 1 - White/Blue and Blue or Blue/White
b. Pair 2 - White/Orange and Orange or Orange/White
c. Pair 3 - White/Green and Green or Green/White
d. Pair 4 - White/Brown and Brown or Brown/White

D. Terminations: Terminate unshielded twisted pair (UTP) cables on RJ-45, 8-pin modular jacks on the client end and approved patch panels as shown on the Drawings. Maintain the twist of the conductors up to the jack terminal. Insert jacks in Face plates and provide filler plates for unused jack ports. For each 48/24 port patch-panel installed place one Ortronics wire-management panel. Install 25% additional ports for expansion on an additional panel to allow for phone installation.

E. Mark patch panel ports, ends of the cables and Face plates/jacks with the drop designations. Complete data jack assignment list and post at jack location.

F. Communications equipment (CE) cabinets/Racks: Provide fire-retardant plywood backboard, one side finished for wall-mount CE cabinets; install Racks. Provide data jack assignment list

(attached to this section) identifying jack number and mating data jack outlet number and location at Rack.

G. Protect existing phone system equipment by disconnecting signal from conductors before existing jacks are removed and re-installed to utilize existing conduit and wall boxes.

4.2 FIELD QUALITY CONTROL

A. Installation housekeeping:

1. Protection of installed work:

a. Provide temporary protection for installed products.

b. Inspect completed installation for physical damage, proper alignment, and anchorage.

c. Provide protective coverings at walls, projections, jambs, sills, and on top of openings. Protect finished floors, stairs, office furniture and other existing items from traffic, movement of heavy objects, storage and other installation debris.

2. Cleaning during construction:

a. Control accumulations of rubbish, excess and waste materials by periodic removal off site for legal disposal. Bag and dispose of installation material scraps off site at the end of each workday. Do not burn or bury materials on site. Do not discharge harmful and dangerous materials on site.

b. Clean and keep interior areas free of dust and other contaminants during work.

c. Maintain cleanliness of work areas at all times.

d. Clean up debris from ceiling or wall penetrations immediately after completion.

e. Clean work areas at the completion of each work activity and at the end of each workday. Work areas are to be left "broom clean."

3. Restoration at completion:

a. Restore existing facilities to original condition, including office furniture or materials moved during construction, after construction is complete.

b. Reinstall drop-in-ceiling tiles removed during construction. Replace tiles that were damaged during construction.

B. Safety: Provide a safe and clean work environment with proper storage and disposal of scrap. Hard hats, safety glasses and safety shoes are to be worn at all times when and where required.

4.3 ADJUSTING AND CLEANING

A. Touch up scratched or marred surfaces to match original finish.

B. Repair or replace LAN terminations that do not meet minimum attenuation specifications.

4.4 ACCEPTANCE TESTING

A. LAN cabling:

1. Test completed systems in accordance with ANSI IEEE 802.3, EIA/TIA-568 and the following. Note: The values listed below are for reference. Auto test feature on many testers will confirm these values.

a. Characteristic Impedance - 100 ohms +/- 15% from 1 MHz to 100 MHz.

b. Attenuation - 22 dB at 100 MHz, per 100 meters or less.

c. Near End Crosstalk (NEXT) - Greater than 32 dB at 100 MHz, per 100 meters. Crossed pairs - No crossed wire pairs.

2. Fill out the data jack assignment list attached to this section, for each rack and turn over to owner's representative. Print detailed reports for each cable segment from test equipment and turn over to owner's representative. Also submit a disk copy of final test results.

3. Post a data jack assignment list in cabinets or racks (see attached form).

END OF SECTION

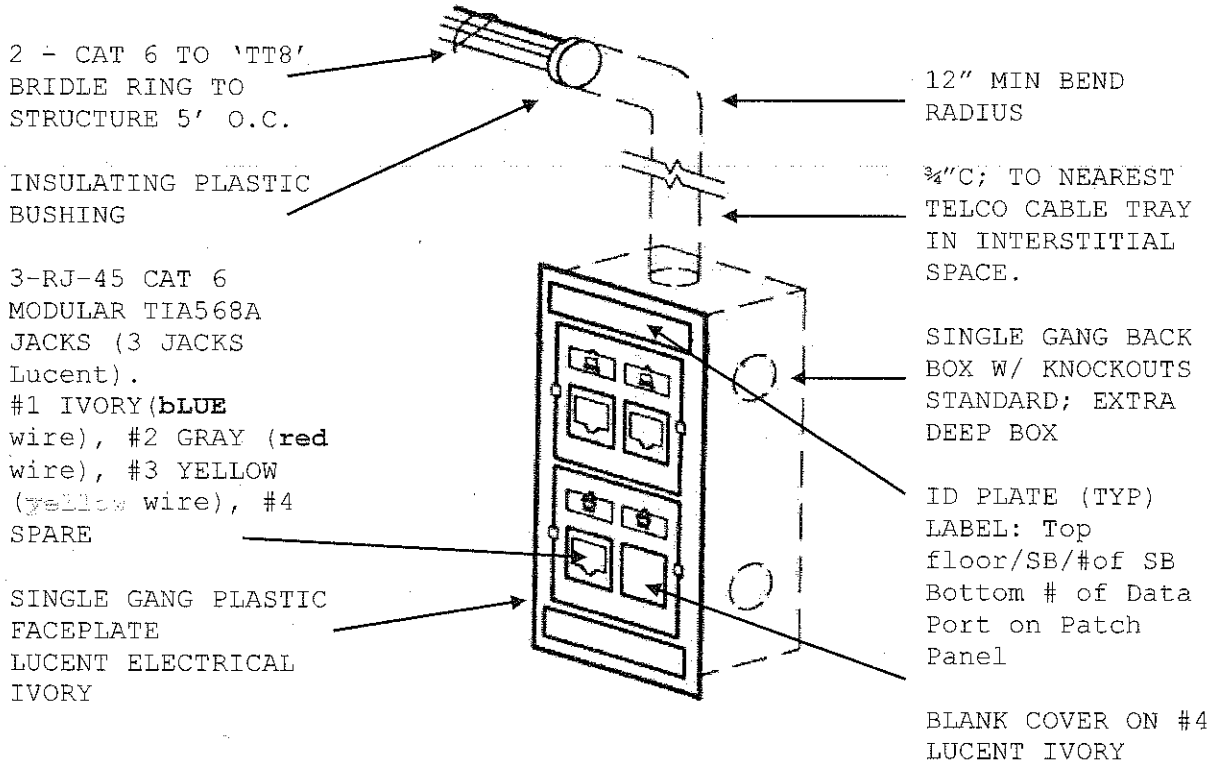
Attachments (4):
Diagram 1: Data Jack Assignment specifications
Diagram 2: Split phone/data specifications
Diagram 3: Wall phone specifications
Diagram 4: Patch Panel Example

NOTES

1. DATA CABLE 24 AWG 4-PR CATEGORY 6 COMPLIANT CABLE, Mohawk/CDT, or approved equivalent (YELLOW, BLUE AND RED).
2. DATA/VOICE JACK Lucent Technologies [YELLOW, IVORY, GRAY]. FCC CERTIFICATION PART 68. MODULAR 8-POS/ 8-COND IDC JACK. TIA 568A STANDARD WIRING W/ WIC. NO SUBSTITUTIONS
3. TERMINATE UNSHIELDED TWISTED PAIR CABLES ON RJ-45, 8-PIN MODULAR JACKS ON THE CLIENT END AND APPROVED PATCH PANELS.

Data jack

568A Wiring Scheme		
		Pin
Pair 1	Bl	4
	WBl	5
Pair 2	WO	3
	O	6
Pair 3	WG	1
	G	2
Pair 4	wBr	7
	Br	8



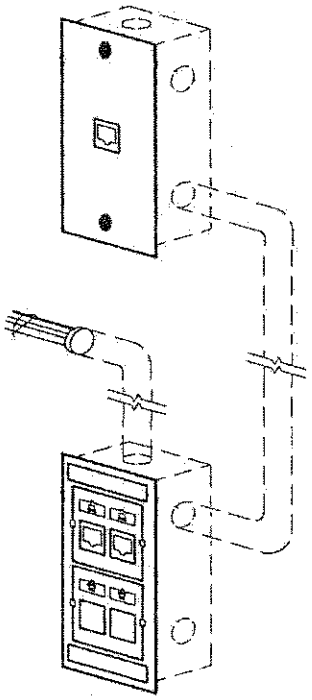
Wall phone and data jack

All specifications same as Diagram 1 with the following exceptions:

- Only jacks 1 and 2 wired for data as specified in Diagram 1, 2 blank covers on positions 3 & 4 of faceplate
- A second conduit to bring yellow cable to wall phone height, wired as shown below

Wall Telephone Jack will be Allen Tel AT219 or equivalent in ivory.

Mapping	
Cat 6 cable	**Jack**
W/Bl	Green
Bl/W	Red
W/Or	Black
Or/Wh	Yellow



See Diagram 1 for details.

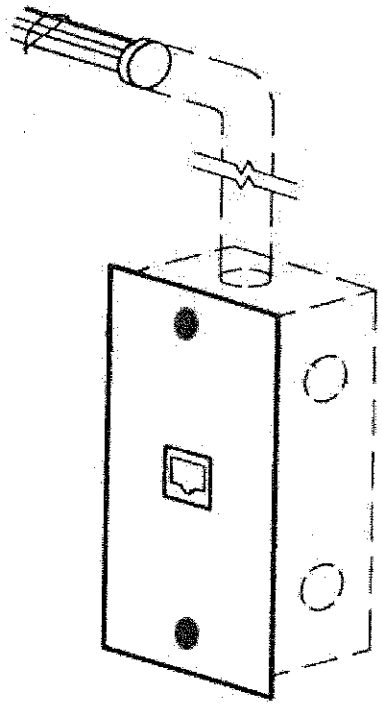
3-RJ-45 CAT 6 MODULAR TIA568A JACKS(3 JACKS #1 IVORY(blue wire), #2 GRAY (red wire)

Wall phone only

The yellow wire is terminated to the jack. The red and purple wires are left unterminated, inside the box. Cable specifications are detailed in Diagram 1.

Wall Telephone Jack will be Allen Tel AT219 or equivalent in ivory.

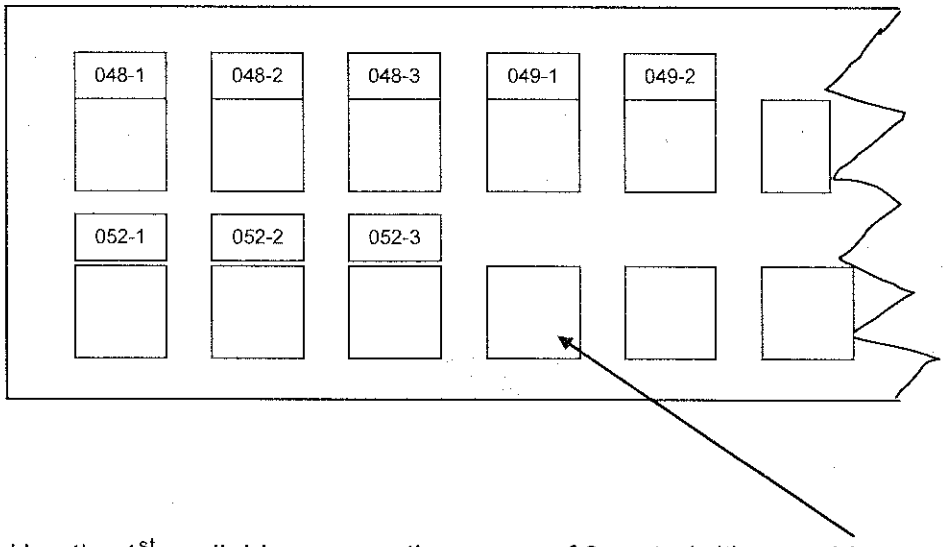
Mapping	
Cat 6 cable	**Jack**
W/Bl	Green
Bl/W	Red
W/Or	Black
Or/Wh	Yellow



See Diagram 1 for details.

3-RJ-45 CAT 6 MODULAR TIA568A JACKS(3 JACKS #1 IVORY(blue wire), #2 GRAY (red wire)

Patch Panel Example



Use the 1st available consecutive group of 3 ports (with no cables terminated to them) and use existing numbering scheme. In the above example, if there were 3 consecutive ports following 052-3, use those, and label 053-1, 2, and 3.

Patch panels are all wired to 568A standard. Follow existing punch down color codes on back of patch panel.

FIBER OPTIC CABLE FOR LOMA LINDA VA MEDICAL CENTER

All new fiber cable installed in the main hospital (building 1), shall be Multimode with ST Connectors unless otherwise specified by information Technology Service. Shall run to the first floor Computer Room (1C-04), Computer Room (3E-18), or the PBX in the basement and then run to the necessary service bay. Information Technology Services will determine end location of fiber runs. All fiber cable installed in interstitial spaces or basement will be ran in inner duct to protect the fiber cable. Fiber cable will be installed following manufacturer's guidelines and installation instructions.

All fiber for new buildings located on Loma Linda Medical Center property will run from the nearest service bay using multi mode fiber cable with ST connectors to run from the main building (building 1) to the computer hub room of the new building. Fiber shall run underground through appropriate conduit. Fiber shall not exceed 600 meter (1968')

All fiber shall be terminated at both ends and tested. Provide a detailed print out of test results to the (COTR) and information Technology.